electricity by imitating salt transport that occurs naturally in the membranes of cells in the body. *Biofuel Cells for Implantable Medical Devices*: we have developed the first enzymatic glucose biofuel cell implanted in a mammal, which was optimised by using a conducting chitosan nanofibrous 3D network electrically connected to laccase and coated with a semi permeable and biocompatible nanoporous chitosan-based film. Recently we demonstrated that the biocathode conserved its catalytic activity after implantation for 6 months in a rat by utilising materials that enhanced the biocompatibility. The ongoing improvements in stability and performance of these electrochemical systems will need bioinspired approaches to enhance their biocompatibility.

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Targeted drug delivery of bisphosphonate nanoparticles for diagnosis and therapy of bone disorders

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Bone has a poor blood supply, which generally consequences in low uptake of therapeutic agents thus necessitating the use of high drug dosages. Bisphosphonates (BPs) have a high affinity to hydroxyapatite and hence are widely used in the treatment of bone disorders. Biodegradable nanoparticles (NPs) due to their sub-micron size and biocompatibility have great potential to be used for therapeutic purposes. Thus, we hypothesize that a targeted delivery mechanism based on BP NPs conjugated to the therapeutic agent will lead to enhance bone uptake. We have engineered a unique biodegradable PEG based BP NPs bearing two functional surface groups: (1) primary amine groups for covalent attachment of a dye/drug (e.g. NIR dye Cy 7 or doxorubicin); (2) bisphosphonate groups for targeting and chelation to bone hydroxyapatite. We have shown the ability of these novel BP NPs to target primary and secondary bone cancer and have demonstrated the potential use of doxorubicin conjugated BP NPs in the treatment of OS. These doxorubicin-conjugated BP NPs, due to their high affinity to Ca^{2+} ions, enable the delivery of doxorubicin directly to the tumor. In addition, their potential use in the treatment of other bone disorders is demonstrated.

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Improving crop yields in a climate change scenario

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Environmental stress conditions, especially drought and soil salinity, are the main cause of the reduction of crop yields worldwide, and these losses will increase in the coming years, at least in arid and semi-arid regions, due to the effects of climate change – longer, more intense and more frequent drought periods, higher average temperatures, less water available for irrigation. Some recent successful examples suggest that soon we will have new cultivars of our major crops with increased tolerance to water deficit and salt stress, modified by genetic engineering or developed using traditional breeding techniques (with the help of new biotechnological tools). Complementary strategies could depend on the domestication of wild species naturally tolerant to stress (halophytes, xerophytes) and on the recovery of some abandoned traditional crops also relatively more stress-tolerant. In the medium and long term, these are probably the most promising approaches to enhance agricultural yields and food production. In the short term, the use of new and improved fertilisers and the so-called 'biostimulants' will help to optimise nutrition efficiency and to enhance abiotic stress resistance of our present crop varieties, thus contributing as well to increased yields. Examples of these strategies will be presented and discussed.

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Cryptic plastids and their biotechnological and biomedical potential

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Green form of plastids – chloroplasts are known as subcellular compartment of plants and algae in which photosynthesis occurs. Despite its many advantages, photosynthesis has been lost numerous times in disparate lineages throughout eukaryote evolution. Non-photosynthetic plastids perform other functions such as synthesis of fatty acids, isoprenoids, iron sulphur clusters, heme, etc. Some of these non-photosynthetic or "cryptic" plastids were overlooked for decades since they have been reduced structurally and their genomes lost most (in some cases even all) genes. The number of complete genome sequences of rudimental plastids is rapidly increasing, thus allowing prediction of the functions of cryptic plastids in various lineages. The plastid genome represents an attractive target for genetic engineering including efficient expression of single or multiple transgenes, and production of proteins as well as value added metabolites of biotechnological interest. A reduced but functional plastid genome is retained in non-photosynthetic residual plastids of some parasitic heterotrophic algae (e.g. Prototheca, Perkinsus), and in protozoan apicomplexan parasites (e.g. Plasmodium, Toxoplasma, Eimeria, Cyclospora, Theileria, Babesia, Sarcocystis, Neospora). Several metabolic pathways can operate in cryptic plastids, they may be essential for the cell survival, and because of this being new parasite-specific target for therapeutic agents.

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Public perception of bio-based products and the bioeconomy – Findings from BIOWAYS project public survey

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More than 450 respondents across Europe participated in the online questionnaire survey by EU HORIZON 2020 project BIOWAYS (Grant Agreement 720762), aiming to assess the level of public awareness on bio-based products and the bioeconomy. The main outcome was that although consumers generally have a positive